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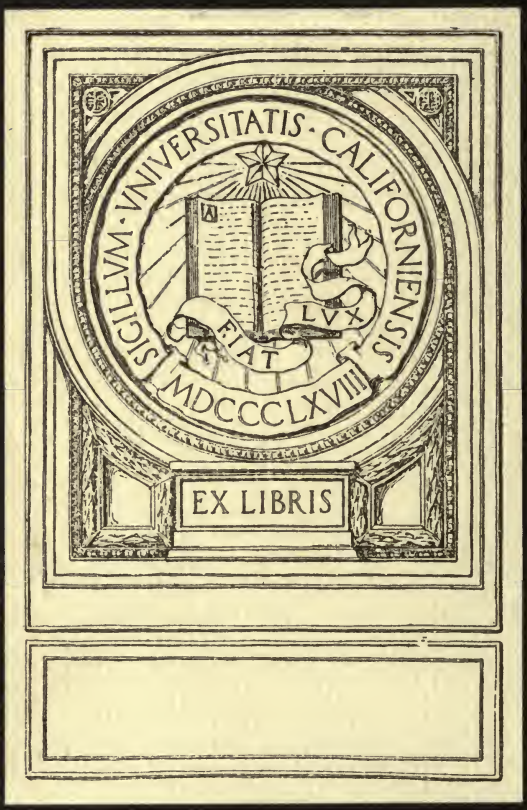
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The Workers' Interest in Costing.

(A Factor of Industrial Reconstruction.)

A PAPER

read before a Conference of the

INDUSTRIAL RECONSTRUCTION COUNCIL

on *TUESDAY, 28th JANUARY 1919,*

by

M. WEBSTER JENKINSON, C.B.E., F.C.A.

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THE WORKERS' INTEREST IN COSTING

(A Factor of Industrial Reconstruction.)

BY

M. WEBSTER JENKINSON, C.B.E., F.C.A.

The Workers' Interest in Costing.

(A Factor of Industrial Reconstruction.)

Out of the battle roar;
Out of the bloody strife;
There gleams afar a new-born star,
A new industrial life.

Follow along its trail
From darkness into light:
Employers' aims and labour's claims
United in the fight

Hitherto the possibility that the workers could or should have any interest in factory costs has not received any consideration, which, after all, is not surprising in view of the fact that the value of efficient factory records has been little understood and less appreciated by manufacturers in this country.

Although generally accepted as merely a method of determining the production cost of an article or process in order to fix the selling price, true factory costing actually demands an analysis of the whole of the manufacturing operations; the collection of statistics of production, progress, and idle time; the segregation of productive and non-productive expenditure; the focus in summary form of the manufacturing efficiency of the entire works organisation.

The benefits to be derived from the cost system depend on the extent to which the information obtained is used by the management in the control and administration of the business.

The Whitley Report marks a new era in the science of British industrial organisation. As the days of slavery gave place to the feudal system, in turn followed by an order under which the employer was master and his employees merely servants to do his bidding, so now it is realised that the workers have, and should have, a greater interest in their work than the amount of the wages they are entitled to draw from week to week in return for their labour.

The lesson of the Whitley Report is that to obtain the best productive results the workers must be taken into the confidence of the management, efficiency and progress being attained by joint co-operation.

The object of such co-operation is, on the part of the employer, to further the interests of his business; on the part of the worker to obtain better conditions of work and higher remuneration for his services: on the part of both to promote the industrial efficiency of the nation.

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The firmly-rooted idea that the lower the wage paid the worker the lower the cost of production and larger the profit is a weed in the field of manufacture to be ruthlessly destroyed.

If we as a nation are to maintain our industrial supremacy, our object must be to obtain the highest percentage of efficiency out of our labour energy, and, consequently, it should be our hope to pay the highest wages in the world, as such would be the direct result of the realisation of our aim.

This end can, however, only be obtained if we eliminate waste : we must cut out the waste of labour lost through old-fashioned modes of manufacture ; the waste of time through the use of plant not suited for the purpose employed and through the occupation of premises not erected for the business carried on therein ; the waste of energy due to failure to educate the workers how best to accomplish their task ; the waste of materials consequent upon inefficient methods of production ; the waste of money through faulty administration and inane competition at ruinous prices ; the waste of waste through lack of scientific knowledge to turn it to practical account.

To secure such result there must, however, be co-operation between employer and worker—a mutuality of understanding that has for its aim the promotion of the interests of each trade, and of each business, and of each worker in that trade. It therefore follows as a necessary corollary that the efficiency data available to the management must also be at the disposal of the workers if the Joint Industrial Councils are to consider more than abstract principles and theoretical propositions.

Costs form a full scale countour map of a business showing the mountains of difficulty to be surmounted, the roads of progress to be followed, the rivers of delay to be crossed, the woods of obstruction which interfere with advancement.

All interested in the direction of the business must, therefore, study the map in order that they may pick their way along the difficult path of industrial management.

Direct Interest of the Workers in Efficient Costing.

Before considering in detail the use to which factory records may be put in the future, it may be useful briefly to consider how the workers already have a direct interest in efficient costing.

Wages Systems.

For any method of piece-work remuneration, or bonus efficiency, or premium system, proper costing data are a necessary pre-requisite if fair and equitable rates are to be fixed.

The prejudice against piece-work is very largely attributable to the fact that rates have been settled without

reference to proper records of the work actually done, with the result that the rates are either so low as to prevent the worker earning more than a bare existence, or so high that, when production has been speeded up to its proper pace, the employer has attempted to cut the rate.

It does not follow that because certain rates are fair in one shop they are necessarily applicable in another. The layout of a factory, the condition of the plant, the progress system in operation, and the extent of the repetition work done, have a very material effect on the amount of wages that can be earned.

If it is agreed that collective efficiency requires the proper reward of individual efficiency, then it is all the more necessary that the standard upon which the basis of recognition is fixed should be such as to secure for the worker the full benefit of the extra output he obtains as the result of his intelligence or skill.

It is often assumed that, provided the workers are on piece-work rates, the extent of their output has no effect on costs, the cost of the product being the same, irrespective of the production. But the amount of scrap made, and the difference in overhead charges on a large output per worker, compared with a small output per worker, are important factors affecting the costs. It is for this reason that some direct encouragement should be given to the piece worker who works at a high economic productive rate, so that each may produce up to his full capacity. To cut rates on account of rapid production may have the effect of increasing instead of decreasing costs, and the worker is penalised instead of compensated for the extra activity he has shown.

These facts are clearly apparent on the careful study of the cost statistics of a business.

Similarly, although direct wages increases often have the effect of reducing production, high wages as the result of high output should be encouraged as beneficial both to employer and employee. The "standard" must, however, be a proper one and calculated on correctly ascertained bases, and this is impossible unless the necessary information is available for consideration.

Flow of Production.

An important factor affecting the earnings of the worker is the regularity and constancy of the flow of production through the shops.

If certain machines are continually breaking down; if production is held up waiting for tools; if defects are occurring after certain operations, causing rejections or rectification; if output is uneven, the workers whose pay fluctuates with production suffer accordingly. The costing system is the lantern which throws the limelight on such obstacles to production efficiency.

The following illustration based on actual facts and figures will serve as a good example :—

At a certain factory the tool room cost for each production unit of 1,000 articles manufactured was 10s. ; at a corresponding factory the cost was 4s. 6d. per unit.

The manager introduced a costing system in the tool room, with the result that in eight months the cost per unit was reduced from 10s. to 2s. 10d. per unit.

This reduction was attributable to the following causes :

(1) Records were available of tools in operation, so that over-stocking of partly-manufactured and finished tools was prevented, and shortage of any particular class of tool avoided.

(2) Weekly percentages of waste were obtained for each operation, and the cumulative waste on the finished tool, so that the attention of the foreman could be directed to the stages of manufacture where too much scrap was being made representing a loss of both material and labour.

(3) Statistics were collected of the number of tools used per unit, any abnormal increase receiving the special attention of the works manager, so that the trouble could be located and rectified.

(4) Oncost percentages were obtained from the monthly costs, so that the management could tell whether there were too many tool-setters or too much supervision compared with the number of tools produced.

(5) The monthly cost summaries showed which of the many different kinds of tools were high in cost, so that the use of such tools could, where possible, be avoided.

(6) The availability of these cost statistics enabled a bonus scheme to be introduced which in eight months resulted in the scrap percentage being reduced from 5¼ per cent. over all to ½ per cent. over all.

The tools were made by girls on repetition work, one girl, so far as possible, being engaged on the same operation on the same type of tool. The lathes were set by skilled charge-hands, whose duty it was to teach the girls and see that they produced good tools. The girls were on piece-work calculated on the good tools produced, the tools being passed to the Inspection Department after each operation.

The foremen, assistant foremen, and the charge-hands received a bonus for each percentage or fraction of a percentage reduction in scrap each week below a certain standard, the information for this bonus scheme being obtained from the cost system without any extra clerical labour.

The effect of the introduction of this costing system, therefore, was as follows :—

(1) The firm reduced the tool cost by 72 per cent.

(2) The tool room operatives earned higher wages owing to the reduction in wasters and consequent increased production.

(3) The foremen and charge-hands received a bonus above their normal wage.

(4) The works operatives were ensured a regular supply of tools, thus facilitating production and avoiding the idle time which had previously occurred.

It is not suggested that the Costing System actually brought about these savings — the result was due to efficient works organisation—but, as the manager himself pointed out, the reduction could not have been made without the costing system, the information provided therefrom furnishing the index which week by week guided the management to the weak spots.

Operation Costs.

There is a standard or proper cost for every operation carried out under normal conditions.

Any excess of cost over that standard is attributable to one or more of the following causes :—

(*a*) Incompetence of the worker, in which case he should be shown the way to become more efficient, or, if he then fail to reach the standard required, replaced by a more capable or adaptable worker.

(*b*) Inefficiency of the plant or tools, resulting in increased cost of production and reduced earning power of the workers.

(*c*) Excessive rejections or scrap due either to (*a*) or (*b*) or to wrong methods of manufacture.

(*d*) Idle time (included in cost of operation) through breakdowns, waiting for material, or faulty works organisation.

The manager or shop superintendent may, as the result of long experience, be able to put his finger on the weak spots and sooner or later detect some of these leakages. Similarly, the old-time gunner, as the result of practice, would hit the mark, but the modern artilleryman knows that the use of his range-finders and the scientific mathematical calculation of velocity and altitude will considerably increase the accuracy of his aim. So the expert factory manager realises to-day that the science of industrial administration requires not only the experience of the individual but, in addition, facts and figures which serve as a never-failing indicator of the internal working of the concern.

A properly devised costing system will week by week or month by month bring to light the reasons for increased costs of production, indicating to which of the above

causes or to what other reasons the excess cost is attributable. True, the costs will not show why the increased expense of production has arisen, but the point at which it occurs is located, with the result that inquiry can be nstituted and steps taken, if possible, to remove the cause.

Uneconomical production either directly or indirectly affects the worker.

In the case of piece-workers, inefficient plant, bad material, idle time, excessive rejections, all mean reduced output and consequently reduced pay. In the case of all workers, heavy production costs will ultimately mean reduction in orders and loss of trade, whilst the employer who is not earning any profits for himself will not usually be generously inclined to his workers.

If, therefore, the employer is able, by the intelligent application of the lessons taught by the cost statistics, to remove the causes to which the high costs of production are attributable, it follows that in many cases the workers also reap a benefit.

An interesting illustration of the worth of adequate cost statistics in eliminating waste is afforded by the cost results of canteens in National Factories.

In the early days heavy losses were made, which continued until the introduction of a proper accounting system, which showed monthly the costs of the various types of provisions, consumption percentages, and running expenses. As a result of the information thus afforded and the comparisons which could be effected, various economies were made possible, the reduction in the losses indicating the value of the cost statistics.

The percentages of these losses were as follows :—

For period ending 31st March 1917, 20.23 per cent.

For half-year ending 30th September 1917, 13.78 per cent.

For half-year ending 31st March 1918, 6.43 per cent.

But for these reductions through proper economic management the probable result would have been an increase in the cost of meals to the workers.

Incentive to Work.

How often is it said that the worker has no interest in his work—but do those who make the complaint ever consider why the worker should have an interest ? What means are adopted to give him an incentive ?

It is true that most men work from necessity rather than from choice ; that most work to live rather than live to work ; but whilst the incentive of wages is the first desideratum, that of itself is not sufficient.

Experience in the munitions factories has shown that when an appeal was made for greater production to satisfy the needs of the army after losses were incurred, or some large expenditure of ammunition had taken

place, the result invariably was an acceleration of output. Why ? Because the worker had some objective in view, because this sudden need for munitions created an interest in the work.

Frequently it has been proved without question that the grant of even a small production bonus has brought an additional output per worker. Why ? Not altogether from the desire to earn more money, as an ordinary increase in wages often has a contrary effect.

The increased production is due to the stimulus which the bonus gives—the feeling that there is something to aim for, something to work for.

Is it not, therefore, clear that some means must be adopted to make the worker feel that the expenditure of greater energy on his part, and the economy in time that he can effect do not pass unnoticed ?

How, then, can an interest on the part of the worker be aroused ? The solution advocated in the Whitley Reports for the formation of Industrial Councils is undoubtedly the most feasible, and if the workers are given the opportunity to study some of the facts relating to the business, many misconceptions will be dispelled and a greater interest in the work aroused.

A premium system of wages which distributes the saving in production cost in fair proportions between employer and employee also undoubtedly acts as a stimulus towards increased effort.

But to make any premium system successful, it is essential that absolutely reliable factory records exist both as regards labour production and machine capacity, as unless the data upon which the time limits are calculated can be accurately ascertained, the "normal" production will be fixed too high, thus giving no opportunity for the worker to benefit, or too low, leading ultimately to rate-cutting and dissatisfaction. Further, the employer must know exactly the overhead charge per unit or he cannot determine what increase in rate he can afford for additional production.

There is little doubt that a good deal of the opposition by the workers in certain trades to premium bonus systems is due to mistrust of the employer ; to a feeling that they will not receive a reward commensurate with the benefit gained by the employer ; to the fact that they suspect a "nigger in the fence."

Accurate cost statistics would, however, convince the intelligent worker that the premium offered had been calculated on a fair basis, and that he was receiving that proportion of the saving in production cost which was his due.

The most equitable method of fixing the "standard" price for a job is to calculate the price on each operation or process ; and although this method can only be adopted in highly standardised jobs, it is the most satisfactory to

the worker, as any alteration in the method of manufacture affects only one or more operations, and prevents a general cut in rates.

Opposition of Workers to Costing Systems.

The average workman is conservative in his ideas and reluctant to accept innovations unless first satisfied that the change is actually of benefit to him.

There is generally a feeling that a system of costing is hostile to the interests of the workers ; there is usually some apprehension that it will operate to their disadvantage ; because they do not understand the purport of the costs, they ofttimes regard the records required in the shops as a method of spying on the work they perform.

If, however, it can be demonstrated to them that to promote greater production efficiency of labour means higher wages, as waste in production must necessarily militate against high labour remuneration ; if they once understand that the object of the costing system is not to furnish a rod with which they are to be chastised, but to secure economy in time and material with benefit both to employer and employee ; if they find the results are to effect smoother working in the factory and reduce idle time, their support and loyal assistance in carrying out their part of the system will follow.

The efficient worker frequently welcomes the record of his individual efforts, particularly when assured that his energy and initiative will bring promotion when the opportunity occurs ; the desire to excel is an ambition inherent in every intelligent man or woman, whatever his or her walk in life.

Another fear of the workers is that the cost statistics will entail pressure being put upon them to work harder.

Increased production does not, however, necessarily mean a greater strain on the workers. The object of scientific management is to obtain the maximum of result with the minimum of effort.

The study of the detailed operation costs of production of an article immediately suggests to the management where reduction in the cost of such operation can be attained.

For example, a manufacturer will introduce new plant of a complex type altering the entire method of production, if satisfied that thereby he can produce more economically or more efficiently, but not until he gets down to the details of his costs does he appreciate that an improvement in the most simple tool or the alteration of method in a minor operation may afford considerable saving. A slight adjustment to a machine may so reduce the physical or mental strain on the operator that increased production follows with less effort than was formerly exerted for the smaller output.

Statistics of output, rejections, and scrap at different periods of a shift also indicate the reaction due to fatigue

and the advantage both to employer and employee of rest periods.

Similarly, cost returns demonstrate that it is frequently possible to secure greater output at less cost by a reduction in working hours, provided at the same time the elimination of waste energy during the shift is effected.

In most manufacturing concerns the cost of production can only permanently be reduced by :—

(*a*) Increasing the rate of production ;

(*b*) Reducing the waste in material ;

and it is possible to give labour a much higher rate of remuneration if the effect is to achieve these objects.

The overhead charges, including use of machinery, depreciation, and interest on capital, will frequently be as high as or higher than the cost of the labour, and, as the percentage of overheads decreases as the rate of production increases, it may be feasible to give the worker the whole of the reduction in labour cost which is due either to his increased effort or to saving of time previously lost.

Similarly, one or two per cent. waste in material may equal many times the cost of the labour on the operation where the wastage occurs.

A mistake made by many manufacturers is to compare the loss in material (if they know it at all) with the total cost of production. The true comparison is with the labour in the particular operation in which the wastage takes place, and, in the case of rejections, the cost of the previous operations must be added to the value of the material spoilt.

Hence it is frequently more profitable to give the worker a bonus for reduction in scrap below a certain fixed standard, even although production is slightly retarded owing to the extra care taken to earn such bonus.

But these factors in industrial management cannot receive adequate consideration unless complete and efficient factory records are available to afford the data upon which conclusions can be formed and action taken. Can it be denied, however, that in undertakings where such statistics can be and are intelligently used by those responsible for the control, the workers must necessarily reap the advantage, and that scientific management based on ascertained facts and figures is a force which must improve the conditions of labour ?

The worker has a very direct interest in efficient costing.

The Potential Value of Costing.

The recommendation in the Whitley Report for Joint Industrial Councils, both National and Local, suggests that efficient factory costing will be essential if any practical benefit is to accrue from the joint deliberations

of employer and employee and the object, viz. greater industrial development, achieved.

It is recognised that at such conferences the employer will not desire to submit complete cost statements for criticism, but much of the costing information can be presented without any risk of injury to the interests of the employer.

The cost systems introduced by the Ministry of Munitions at National Factories present no special features, but their particular value has been derived from the comparative results afforded to the Administrative Departments of the relative production costs at a number of factories engaged on the same product. That such comparative statistics have furnished most useful data for management purposes has been clearly shown in the evidence given before the Public Accounts Committee, and there seems to be no reason why similar information should not be obtained by, and used for, the control of various industries.

To make good the waste of war is a problem which now has to be faced, and it can best be effected by eliminating waste wherever possible.

Before, however, this end can be achieved, it is necessary to ascertain where such waste occurs; and to locate all possible sources means an examination of the production results of the firms engaged in each industry.

A 10 per cent. increase in our aggregate productivity would soon make good the cost of the war.

The Whitley Committee in Clause 16 of their Interim Report suggested, among the questions with which the National Councils should deal or allocate to District Councils or Works Committees :—

"III. The settlement of the general principles governing the conditions of employment, including the methods of *fixing, paying, and readjusting wages* having regard to the need for securing to the workpeople a share in the increased prosperity of the industry.

VI. *Methods of fixing and adjusting earnings, piece-work, prices, &c.*, and of dealing with the many difficulties which arise with regard to the method and amount of payment, apart from the fixing of general standard rates.

VIII. Industrial research and *the full utilisation of its results.*

X. *Improvements* of processes, machinery, and *organisation*, and *appropriate questions relating to management.*"

The consideration of these problems involves the examination of reliable factory records, and, as regards

the National Councils and District Councils, the presentation of comparative data in such form that conclusions may be deduced therefrom without any detailed investigation by the members.

It would therefore seem necessary that, attached to each Council, there should be a Statistical Officer, whose function it would be to collect from the various industrial undertakings statistics of costs, manufacturing efficiency, percentages of waste, and similar information, and to present such details in the form of comparative statements or charts for the guidance of the members of the Council.

But, useful as figures are to prove facts, it also follows that figures may be so misleading as to confuse rather than to assist deliberations. Particularly is this the case with the production records of a manufacturing concern, and if the comparative data presented are to serve any useful purpose, it follows that the records of each factory must be kept on the same principles, and the information collected under the same heads and sub-heads.

This can only be attained by the various undertakings following the example of the National Factories, each group adopting the same system of factory accounting and preparing its costs and other factory statistics in the same form.

The following is an example of a comparative statement for a group of shell factories :—

DEPARTMENT OF FACTORY

COSTS AT NATIONAL

REPORT by S.M.E. 6 upon Factory Efficiency as shown by

Factory	PRODUCT.			Capital Cost of Factory to Ministry.	Designed Capacity per Week.	Present Capacity per Week	Allocation per Week	No. of Shifts per Week	Total hours in Shifts per Week	Commensurate Net Production per Week	Quantity Bonded (or passed) during month. (a) Four Weeks (b) Five Weeks	EFFICIENCY STANDARD
	Nature	Size	Mark.									Total Cost
(1) No.	(2)	(3)	(4)	(5) £	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1 23	Shell, Empty H.E.	18pdr.	III	28,472	6,000	6,200	6,000	18	144½	5,300	(a) 21,000	9/0
2 5	Ditto	"	"	12,514	4,000	4,000	4,000	18	144	3.783	(a) 15,500	8/3
3 17	Ditto	"	"	18,251	4,500	4,500	4,500	12	100	4.401	(a) 18,000	8/0
4												
5 15	Ditto	4·5"	IX	48,567	8,000	8,000	8,000	12	103	6,147	(a) 27,000	20/6
6 27	Ditto	"	XII	11,866	1,000	1,200	1,200	12	106	1.170	(a) 4,500	21/0
7 33	Ditto	"	IX	75.591	7 5 0	8,000	8,000	12	98	6,500	(a) 27,000	20/6
8 21	Ditto	"	XII	13,966	1,000	1,000	1.000	18	131	555	(b) 3,061	23/0
9												
10 7	Ditto	6"	XII	30,920	3.500	3.500	3,500	18	123	3,057	(a) 12,440	52/0
11 11	Ditto	"	XIII	114,000	7,500	7,500	7,500	18	120	4.600	(a) 16,750	49/0
12												
13												
14 25	Ditto	8"	XIIa	28,627	650	650	650	12	134	201	(a) 756	114/0
15 18	Ditto	"	IV	34.997	650	650	650	—	—	258	(a) 1,366	97/6
16 41	Ditto	"	IXa	32,786	650	750	650	18	120	731	(a) 2,645	97/6
17 43	Ditto	"	XIIa	30,462	650	650	650	—	—	433	(a) 1,937	97/6
18												
19 50	Ditto	9·2"	X	64,561	1,500	1,500	1 500	—	—	1,389	(a) 5,522	153/0
20 9	Ditto	"	"	60,114	1,000	1,000	1,000	18	135	962	( ) 5,285	160/0
21 31	Ditto	"	"	73,568	1,200	1,200	1,200	—	—	821	(b) 5,403	156/0
22												
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AUDIT AND COSTS. Form No. 1.

SHELL FACTORIES.

the Latest Cost Returns received up to 31st October 1918.

ACTUAL COST PER UNIT. (per Monthly Return)					Comparative Contract Figure (based on price paid during period to outside firms)	Previous Month's Costs	Percentage of Oncost to Productive Wages	PRODUCTION PERIOD		SUPPLY DEPARTMENTS' COMMENTS. (Giving reasons for high or low cost rates, etc.).	
Material	Wages	Oncost	Depreciation	Total Cost				Month	No.		
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	
5/2	1/9	2/10	3d.	10/0	11 2	9/8	162	Aug.	31	Production decreased 6%. Maintenance on Plant and Tools high.	1
5/1	1/6	2/5	3d.	9/3	11 5	9/5	161	Sept.	29	Production in reased 2%.	2
5/2	1/5	1/10	3d.	8/8	11 2	8/6	129	Sept.	28	1,000 Shell required Re-banding through failure to pass Gun-test.	3
											4
14/2	2/2	4/6	6d.	21/4	27/11	22/1	208	Sept.	33	Production increased 5%.	5
14/2	2/9	4/3	6d.	21/8	28/5	21/11	155	Sept.	26	Production increased 2%.	6
14/1	2/9	5/3	10d.	22/11	27/11	23/2	191	Aug.	17	Decreased expenditure on Maintenance of Plant and Tools.	7
15/6	4/1	7 6	1/6	28/7	28/8	29/3	183	Sept.	5	Increased production 5%.	8
											9
38/11	5/6	8/8	10d.	53/11	67/6	52/3	158	Sept.	32	Decreased production 13%.	10
36/6	6/1	12/10	1/9	57/2	63/0	58/1	211	Aug.	4		11
											12
											13
86/6	11/8	41/0	9/0	148/2	132/8	160/1	351	Aug.	2	High Cost due to early production period on this Mark.	14
85/3	8/0	14/1	10/1	117/5	132/3	114 6	177	Sept.	21	Stopping manufacture of this Mark.	15
85/2	9/2	12/0	3/9	110/1	132/3	113/9	131	Sept	4	Production increased 15%.	16
83/7	8/5	16/8	7/3	115/11	132/8	119/6	198	Sept	3	Production increased 31%.	17
											18
131/10	7/8	20/6	4.0	164/0	201/7	166/1	267	Sept.	17	Increased production 12%. Holidays during previous period.	19
132/7	13/11	24/0	5/2	175/8	207/1	176/11	172	Aug	4	Production increased 5%.	20
134/5	8/2	23'2	7/3	173 0	207/1	173 3	284	Sept.	14		21
											22
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DEPARTMENT OF FACTORY

• COSTS AT NATIONAL

Supplementary Analysis relating to Factory Efficiency Report

Oncost Percentage														
During last financial year (approx.)	During Period	Power	Light	Buildings	Plant	Tools	Tool Setters	Viewers and Examiners	General Labour	Superintendence	Timekeeping	Charge Hands and Foremen	Shop Stores	Storekeeping
(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
		d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d	d.	d.
170	162	4·3	·5	3·6	2·4	4·3	1·8	2·8	4·4	2·6			·5	1·3
158	161	3·6	1·0	2·3	1·2	3·0	1·5	2·2	3·3	1·2	·8	1·1	·7	·5
140	129	2·2	·8	2·0	·7	2·3	·7	·5	5·4	·5	1·0	·3	·4	1·0
180	208	4·3	2·0	·7	3·8	6·5	5·6	6·0	6·4	·7			4·6	·8
171	155	3·7	2·2	1·4	2·8	5·8	6·0	5·4	6·3	1·0	1·0	·5	3·8	·4
183	191	4·6	2·6	3·3	3·2	6·2	5·4	5·5	4·4	6·5	1·8	4·0	2·4	
179	183	9·3	2·6	·8	1/0·2	1/0·3	4·0	1/0·3	11·6	8·0	1·3	·8	1·0	3·3
165	158	5·2	2·0	2·0	8·3	6 3	2·7	3·2	2/8·5	9·0	2·2	4·5	3·3	2·3
190	211	10·8	5·0	2·0	1/3·5	11·2	4·7	6·7	3/9 6	9·0	2·3	6·0	5·5	3·2
195	351	3/6·5	6·5	10·8	7/6·7	7/3·2	3/0·5	2/6·2	6/4·5	2/4·5	4·5	5·5	1/6·5	6·8
168	177	1/9·5	8·5	7·0	1/9·5	1/9	1/4·2	9·5	1/11·3	7·2	2·0	3·0	8·5	3·0
158	131	1/7·2	6·5		2/0·5	1/0·5	1/2·5	1/1·3	1/7	8·5	2·3	2·0	5·0	4·8
193	198	2/3	9·7		1/10·5	3/8·5	1/5·2	3·5	2/7·3	7·5	2·7		1/6·5	·5
215	267	1/2·7	9 2	2·3	1/10	2/11	2/0·7	1/10	5/3·6	7·6	·6	4·0	1/1·7	3·2
193	172	2/7·7	3·7	3·0	6/1·5	2/1·7	2/8·5	1/5·5	3/10·5	10·3	3·5	6·0	7·8	1·5
201	284	2/5·2	6·0	5·7	5/8	2/2	2/2·5	1/8·7	4/5	8·0	4·0	3·3	5·2	2·0

Although it might not be possible to give the same details owing to the natural reluctance of firms to divulge the internal working of their factories to competitors, it could be agreed by the members of each Council to what extent information should be published.

For example, in the following illustration the percentages of scrap made in the tool room at each operation

AUDIT AND COSTS. Form No. 1.

SHELL FACTORIES.

on Latest Cost Results Received up to 31st October 1918.

Idle Time	Rectifying	Management	Office Salaries	Office Expenses	Printing and Stationery	Head Office	Travelling Exs.			Sundries	Total Oncost	REMARKS	
(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	
d.	d.	d.	d.	d.	d.	d.	d.			d.	s d		
·2	2·4	2 3		·2			·4				2/10		1
1·0	1·0	1·4		1·0	·5					1·7	2/5		2
·6	·5	1·0		·5			·6			1·0	1/10		3
													4
4·5		3·3		1·8	·2		·4			2·4	4/6		5
3·3	·6	2·8		1·4	·5		·8			1·3	4/3		6
	1·0	1·5		3·0	·5		1·3			5·8	5/3		7
·9	2·0	2·3		1·0	·3		1·0			3·0	7/6		8
													9
	1·0	6·5		2·0	2·0	1·2	2·3			5·5	8/8		10
	2·0	9·7		3·0	2·2	2·0	1·5			6·1	12/10		11
													12
													13
		1/8·3		7·2	2·5		4 5			1/1	41/0		14
		4·0	2·0	3 2	1·0	·8	2·0			3·8	14/1		15
·3		4·5	3·0	1·0	·4	1·7	1·0				12 ·0		16
		3·7	5 0	·7	2·0		2·5			1·2	16/8		17
													18
	4·5	8·0		2·5	2·5		1·7			4·2	26/6		19
		1/0·5		4·3	·5		·7			6·8	24/0		20
	2·0	9·7		3·0	1·1		1·1			3·5	23/2		21
													22
													23
													24
													25
													26
													27
													28
													29
													30

could be disclosed without materially prejudicing the interests of the firm, particularly if it were the duty of the Statistical Officer to select and submit only those statistics which he considered of interest, without indicating the identity of the undertakings from which the information was derived.

COST OF

For Case ·303 Shop or Five

Drawing No	DESCRIPTION OF TOOL	Material issued to make	Cumulative % of Scrap	QUANTITIES				TOTAL VALUES								
				Issues to Case Shop	Issues to Date	Stock at Close	Stock in Operation	Materials			Wages			Oncost being 103 827 % on Wages		
								£	s	d	£	s	d	£	s	d
101	1st Case Punch ..	448	1 648	404	1,560	191	1,477	15	19	8	9	6	5	9	13	6
102	„ Dr. Case Top Die ..		13·29	1,129	2,980		2,513				12	18	4	13	8	3
103	„ „ „ Bottom Die		31·961	3,103	8,686	510	3,166				26	9	1	27	8	5
104	2nd „ „ Punch ..	680	4·498	312	1,055	565	2,173	33	11	4	22	16	2	23	13	9
105	„ „ „ Top Die ..	76	12·7	1,207	3,449	333	2,074	3	12	0	9	15	7	10	2	1
106	„ „ „ Bottom Die	72	14·148	3,424	9,535	1,524	3,593	3	0	8	17	10	0	18	3	6
107	3rd „ „ Punch ..	50	6·528	324	1,038	222	1,477	2	12	6	16	17	0	17	10	0
108	„ „ „ Top Die ..	836	19·378	567	2,126	785	1,927	39	7	2	12	16	5	13	6	3
109	„ „ „ Bottom Die	2,035	12·999	3,142	11,045	1,405	2,944	89	5	9	31	8	8	32	12	10
110	4th „ „ Punch ..	748	3·628	538	1,560	51	1,762	41	16	3	24	18	10	25	18	0
111	„ „ „ Top Die ..	1,043	8·909	1,008	3,028	495	1,894	50	18	10	15	12	4	16	4	4
112	„ „ „ Bottom Die	4,278	11·004	5,598	17,543	2,255	3,404	185	8	6	57	10	2	59	14	3
113	1st Cut Off Noses ..			48	186	60	66				6	3	9	6	8	5
115	Indent Punch	855	9·323	1,225	3,409	73	3,338	9	10	10	22	16	7	23	14	1
116	„ Centre	6,943	16·363	4,830	14,312	1,007	3,911	63	11	3	112	9	2	116	15	4
117	„ Extractor Sleeve		11·06	373	1,133		2,077				8	16	7	9	3	4
118	„ Die		7·023	1,240	2,844	134	2,147				6	1	4	6	6	0
119	Heading Punch ..	900	7·065	1,260	3,107	135	1,174	37	18	10	38	9	0	39	18	6
120	„ Bumper ..	4,569	1·836	2,796	8,258	2,318	1,614	65	13	6	185	6	8	192	8	7
121	Front Heading Die ..	1,801	5·645	2,460	6,104	260	2,769	87	14	2	37	3	9	38	12	3
122	Back „ „ ..		2·366	336	1,390	466	1,440				3	2	0	3	4	5
123	1st Necking „ ..	1,307	3·697	1,143	2,984	27	785	35	11	5	19	13	9	20	8	10
124	2nd „ „ ..	1,270	3·361	1,155	2,939		833	37	11	3	18	11	6	19	5	9
125	3rd „ „ ..	1,136	10·838	1,177	3,212	102	519	29	7	0	15	17	11	16	10	0
126	Fin. Tapering „ .	748	13·294	1,404	4,056	303	1,415	62	0	1	38	8	0	39	17	6
127	Opening Pluggers ..				118	83										
128	1st „ ..				143	521	2									
129	2nd „ ..			12	200	177										
130	3rd „ ..			12	148	101										
131	Fin. Tapering Bumper	348	23·811	607	1,480	89	74	5	17	11	18	8	10	19	3	0
132	„ „ Extractor	628	·318	304	835	72	627	10	11	11	13	6	4	13	16	6
133	„ „ Punch H'dr	204		54	216	154		9	5	9	10	0	2	10	7	10
134	Head Trimming Die ..	640	8·506	193	569	37	1,082	17	9	0	12	10	7	13	0	2
135	Length „ Cutters..	1,056	·239	416	1,048		1,266	9	1	2	4	10	0	4	13	5
136	Head Trim. Cir. „ ..	236	·406	213	512	154	73	9	4	2	7	10	11	7	16	8
137	„ „ Extractors .			12	72	23	476				0	6	4	0	6	7
138	„ „ Punches ..				50	1,118										
139	Piercing Sets			42	78	111	1									
140	„ Punch			84	156	17	77				0	7	5	0	7	9
141	„ Stems				Nil	128	101				0	5	4	0	5	6
142	„ Nuts (Spares) ..				„	177										
143	„ Noses „ .	98		78	164		100	1	17	0	18	8	2	19	2	3
144	„ Cones „ ..	336		367	619	132	252	1	13	7	15	0	4	15	11	10
	Tools Hardened										0	8	6	0	8	10
							Total	£959	11	6	£872	1	11	£905	9	6

TOOLS — Form No. 2.

Weeks ending June 29th 1918.

Total Cost	UNIT VALUES: Material	Wages	Total including Oncost	Total for last May	QUANTITIES AND VALUE OF TOOLS CONSUMED PER MILLION: Operation against which Issued	Quantities per Million	Total Cost of Issues	Tool Cost per Million
£ s d	s d	s d	s d	s d			£ s d	£ s d
34 19 7	8·562	7·086	1 11·005	1 11·815	1st Draw Case	12·112	48 6 2	1 3 2
26 6 7		2·38	4·851	4·732	" " "	27·132	25 7 0	0 12 2
53 18 6		2·506	4·19	3 93	" " "	74·575	43 11 7	1 0 11
80 1 3	11·847	7·823	2 3·792	2 4·498	2nd " "	7·598	36 2 7	0 17 7
23 9 8		1·692	3·448	5·162	" " "	29·394	56 7 6	1 7 5
38 14 2		1·705	3·475	3·866	" " "	83·386	44 3 10	1 1 6
36 19 6	1 0·6	10·024	2 9·031	3 2·489	3rd " "	8·148	44 11 10	1 2 5
65 9 10	11·719	3 748	1 7·358	1 7·66	" " "	14·26	45 14 8	1 3 0
153 7 3	10·855	3·036	1 5·043	1 6·015	" " "	79·022	159 15 4	4 0 10
92 13 1	1 1·433	11,985	3 1·861	3 6·339	4th " "	13·014	84 17 5	2 1 2
82 15 6	11·778	3·815	1 7·554	1 8·289	" " "	24·384	82 2 6	1 19 11
302 12 11	10·641	2·853	1 4·456	1 5 154	" " "	135·42	304 8 2	7 7 6
12 12 2	7·734	1 3·519	3 3·365	3 8·275	Cut off	1·17	7 17 5	0 3 11
56 1 6	2·152	4·258	10·831	1 4·277	Indenting	31·149	55 5 8	1 8 4
292 15 9	2·211	3·925	10·211	11·276	"	112·816	205 9 11	5 4 10
17 19 11	6 41	5·089	1 4·782	1 1·082	"	9·484	26 1 7	0 13 4
12 7 4	10·315	3·973	1 6·413	1 6·66	"	31·53	57 5 10	2 2 5
116 6 4	10·129	7·851	2 2·131	2 3·29	Heading	34·211	117 6 8	3 4 0
443 8 9	3·454	9·871	1 11·573	1 11·623	"	75·8.6	274 12 6	7 9 6
163 10 2	11·919	4·317	1 8·718	1 7·392	"	66·793	161 5 0	4 7 11
6 6 5	1 1·274	5·772	2 1·038	2 2·685	"	9 123	25 4 7	0 13 9
75 14 0	6·511	3·91	1 2·48	1 1·188	Necking	28 955	68 19 2	1 15 1
75 8 6	7·104	3·525	1 2·288	1 0·421	"	29·259	68 15 2	1 15 1
61 14 11	6·201	3·505	1 1·345	1 0·406	"	29·817	65 8 11	1 13 4
140 5 7	1 8 055	11·195	3 6·873	3 4·019	Tapering	36·947	116 3 0	3 1 4
	2·139	5·484	1 1·316	1 1·15.	Necking			
	2·139	4·323	10·95	10·821	"			
	2·139	5 03	1 0·399	1 0·249	"	·303	0 12 5	0 0 4
	2·139	7·457	1 5·338	1 5·117	"	·303	0 17 4	0 0 5
43 9 9	4·101	8·269	1 8 955	1 10·516	Tapering	15·973	52 19 11	1 8 0
37 14 9	4·602	5·194	1 3·188	10·225	"	8·0	19 4 9	0 10 2
29 13 9	10·926	11·774	2 10·924	5 4·511	"	1·421	7 17 2	0 4 3
42 19 9	6·543	8·368	2 1·637	2 2·93	Head Trim	4·94	20 12 4	0 10 7
18 4 7	2· 61	1·57	5·361	5·403	" "	10·618	9 5 10	0 4 9
24 11 9	9·364	5·797	1 9 183	2 1·17.	" "	5·452	18 16 0	0 9 8
0 12 11		5·895	1 0·015	11·844	" "	·307	0 12 0	0 0 4
	1·348	6·325	1 2· 4	1 2·052	" "			
	1 7·79	12 6·445	7 2·437	26 9·964	Piercing	1·03	57 2 6	1 8 2
0 15 2	1 1 208	3·749	1 8·849	1 10·093	"	2·061	7 2 11	0 3 7
0 10 10	9·99	5·15	1 8·487	1 7·922	"			
	4·66	1 1·0	2 7·157	2 6·771	"			
39 7 5	4·53	3 10·029	8 2·349	8 1·778	"	1·914	31 19 3	0 15 8
32 5 9	·73	6·91	1 2·814	1 1·613	"	9·056	22 13 1	0 11 11
0 17 4								
£2,737 2 11							£2,474 19 6	£63 17 5

TOOL ROOM for ·303 Case. Five Weeks ending June 29th 1918. Form No. 2.

Scrap percentage at each operation and Cumulative.

Drawing No.	Description.	Percentage of scrap at each operation from defective material and machine waste — Operation Nos.												Cumulative % of scrap	Remarks
		1	2	3	4	5	6	7	8	9	10	11	12		
101	1st Dr. Case Punch							1·648						1·648	
102	" " " Top Die . ..			·342	10·299		3·002							13·29	
103	" " " Bottom Die			6·274	12·828		7·683							31·961	
104	2nd " " Punch			·454			·285	3·529	·268					4·498	
105	" " " Top Die	4·054		·357	1·579		7·219							12·7	
106	" " " Bottom Die			·322	10·867		3·368							14·148	
107	3rd " " Punch						·413	5·418	·763					6·528	
108	" " " Top Die	2·184		·117	10·289	·72	7·349							19·378	
109	" " " Bottom Die	1·791		1·527	6·234		4·057							12·999	
110	4th " " Punch	·133			·117			2·506	·902					3·628	
111	" " " Top Die	·489			1·572		6·998							8·909	
112	" " " Bottom Die	·782		·803	3·831		5·973							11·004	
115	Indent Punch				·578	·116	5·498	3·376						9·323	
116	" Centres		·346			8·483	8·292							16 363	
117	" Extractor Sleeves ..		1·215			9·966								11 06	
118	" Die						7·023							7·023	
119	Heading Punch	·1			·448		3·508	3·155						7 065	
120	" Bumper	·131	·1	·1		1·509								1·830	
121	Front Heading Die	·113	4·21	1·024		·365								5·645	
122	Back " "		·464	·517	1·4									2·366	
123	1st Necking "			3·604		·096								3·697	
124	2nd " "	·078		3·196		·092								3·361	
125	3rd " "	·087		9·452	·08	1·365								10·838	
126	Fin. Taper Necking Die	2·239	6 954	·365	4·328									13·294	
131	" " " Bumper ..	·862	4·751	19·314										23·811	
132	" " " Extractor ..	·318												·318	
134	Head Trim & Cut off Dies		1·863	2·108	1·337		3·47							8·506	
135	Length Trimming Cutters			·239										·239	
136	Head Trim & Cut off Circular Cutters				·406									·406	

Another form used to collate the results of National Factories is the statement showing the production per worker and time per unit :—

NATIONAL FILLING FACTORIES. SUMMARY OF TIME AND PRODUCTION. Form No. 3.

NATURE OF OPERATION. Filling 6in. H.E. Shell. Amatol 80/20 Marks III. XI. Unit 1.

Factory	Month	Period	Production	Number of Workpeople	Hours Worked.		Production per Worker per week	Time per Unit	Wages paid per Unit	Lost Time	Time charged Ministry	Remarks
					Normal	Overtime						
			No.	*			No.	H. M.	£ s d			
No. 2a.	April		77,350	110·7	16,600		232·9	12·9	2·89			
"	May		62,810	92·0	13,797		227·6	13·2	2·97	89		Waiting for materials
"	June		185,350	159·2	39,794		232·9	12·9	2·86			Three units now working, as against one in April and May
"	July		155,650	170·7	34,145		227·9	13·2	2·90	75		Waiting for materials
"	August		208,829	171.6	42,910		243·3	12·3	2·99			Units now working nearly up to maximum capacity
No. 6	April		531,233	1035·9	207,182		128·3	23·4	5·95			
"	May		373 237	692 5	138,491		134·8	22·3	5·48			Fewer units engaged on this size during period
"	June		662,339	862·3	215 563		153·7	19·5	4·79			All units available now concentrating on this operation
No. 14	April		65.342	132·7	25 427	1,116	123·1	24·4	5·06	313¾		First month of production Lost time due to shortage of component supply
"	May		72.470	136·0	26,875	320	133 2	22·5	4·78	697		Lost time due to thunderstorm
"	June		139,400	192 2	47.990	47	145·1	20·7	4·86	124		All units apportioned to this size now working
"	July		82,655	154·6	30,621	289	133·7	22·4	5·29	44		Order completed during this month

*Each 50 hours worked is taken as equal to one worker.

Note :—Factory No. 2a. is equipped with more up-to-date machinery than the other two factories,

These examples are merely given for illustrative purposes ; it is not suggested that they are applicable to every industry ; it is not proposed that they should even serve as a model of the type of information required. It is necessary to study the individual requirements of each industry before it can be determined what information should be available to serve the needs of the councils it is proposed to set up.

There would seem, however, little doubt that to make such information of any tangible value, it would be necessary for each National or District Council, as the case may be, to appoint as Statistical Officer a costing expert, who could devise not only the form of the statistical returns required, but also the system of factory accounting to be installed in each works. In no other way can the statistics of costs and manufacturing efficiency from a group of factories serve any useful purpose, and as in the Ministry of Munitions it has been necessary to standardise the system of factory accounting for each class of factory and lay down rules for the allocation of wages and overheads before comparative results could be obtained, so if the National and District Councils require costing data for their guidance it will be necessary for them to create an organisation to secure the presentation of the costs in proper form.

The information to be supplied to the works committees would, of course, be a matter for determination in each individual case, but probably the data supplied to the Councils would form the subject of inquiry so far as it affected each particular factory.

In a discussion which followed a paper by Mr. Sanderson Furniss on "The State and Industry during the War and after," at the National Conference of Working Class Associations, held under the auspices of the Ruskin College at Manchester in May last, Mr. C. B. Parkin referred to a conversation which he had with an American Labour delegate, who told him that in his industry they had rules which penalised workers who wasted materials.

Mr. J. G. Clapham, in the course of the debate, also stated that "in the control of industry the workers' aim "should be the elimination of all waste, both of idle time "and of material, so that the smallest number of hours "should be spent in producing the necessary commodities."

If once the workers generally will recognise the importance to themselves of eliminating waste in manufacture they will, in the words of the Whitley Report, "be the best builders of national prosperity."

Mr. W. L. Hichens, the Chairman of Cammell, Laird & Co., Ltd., and one of the most progressive of our commercial leaders, in a pamphlet on "Some Problems of Modern Industry" says, "Unless it is made unmistakably "clear that industry is run for the benefit of the whole

" community and not for the enrichment of certain " classes, restriction of output will continue, and the " reforms which are so urgently needed will be sadly " hampered . . . .

" Housing and education, the cost of which will be " formidable, will be of little or no avail, unless a high " standard of wages is established . . . .

" It is quite clear we shall not be able to meet the " bill unless we can effect drastic economies in produc- " tion."

Thus on the one hand the representatives of Labour, and on the other hand a representative of Capital urge that the reduction in the cost of production by the elimination of waste should be the aim of those who wish to better industrial conditions and promote national prosperity, and it is clear such reduction cannot be effected except by a careful and detailed study of the statistics of manufacturing efficiency.

Statistical research and the opportunity which it is suggested should be given to the worker to become acquainted with the real facts will clear away many of the cobwebs of dissension.

The worker will recognise that, where prices are regulated by competition in the markets of the world, increased wages can only accrue by economy in production ; the employer will understand that high wages under proper conditions mean greater prosperity, and that long hours do not always mean larger dividends.

In a manufacturing concern profits are derived from four sources :—

(1) Economical production.

(2) Judicious buying.

(3) Effective salesmanship.

(4) Speculation.

Frequently, when a company pays large dividends, there is considerable talk by a certain class of agitator about the excessive profits, which, it is claimed, rightfully belong to the workers, and the company is cited as an example of a baneful capital system.

Possibly, however, the profits have been derived from sources other than actual manufacture.

Cases could be quoted of firms which in very successful years have actually made a loss in their Production Departments, the whole of the profit being due to skilful buying of raw material. Every manufacturer is a merchant, and when he obtains his material below the market rate at the time of use, or sells his product above the current price at the time of manufacture, the merchanting profit he makes would not be claimed by any worker who understood the real position and how the profit had

been earned. On the other hand, where such profits are due to the increased productivity of the workers or reduction in waste through their efforts, then they may rightly claim to participate in the results attained, irrespective of the profits or losses incurred by the management in the commercial as distinct from the manufacturing side of the business.

Unfortunately, however, at the present time in many cases the manufacturer himself does not know where he makes his profit or where losses are taking place. He thinks he knows, but very frequently his opinion is founded on wrong bases.

Only by the scientific compilation and intelligent consideration of statistical records, so that the attention may be directed to the costs and production data of each operation, whether of manufacture, of distribution, or of administration, can it be ascertined where profits are being earned or unnecessary expense being incurred.

The workers have a very pertinent interest in the welfare of the whole industry in which they are engaged. The manufacturer, if unsuccessful in one direction, may, if he has the necessary capital, develop some other line of business, but the skilled worker can only sell his labour in the trade in which he has been trained. If a trade is being carried on under old-fashioned conditions, with obsolete plant or with excessive waste of material, competition will sooner or later encompass its destruction. These obstacles to success would be revealed by the cost and other statistical information which, it is suggested, should receive the consideration of the Industrial Councils and enable pressure to be exercised to effect the alterations necessary.

But the worker cannot take any intelligent part in the control of industry unless he is equipped with reliable statistical knowledge of the facts.

For example, to consider a few illustrations of wasteful production which must necessarily re-act on the workers :

(1) In a certain trade restricted to one locality competition is so keen that frequently as many as fifteen travellers representing rival firms have been known to be in one town at the same time. Expensive London show-rooms are also maintained by each large firm.

The result is that the percentage of administrative expenses is high, whilst the rates of wages are low. The consideration by an Industrial Council of statistics showing such results would surely ensure some alteration in the methods of business generally.

(2) An investigation of the costs of manufacture of a certain product showed that whereas some makers

used only virgin metal, others mixed in scrap varying in proportion up to 80 per cent. in one case.

In fixing a flat price, contractors were instructed to use a certain percentage of scrap, the result being to produce a much cheaper article than hitherto.

If an Industrial Council had existed, the differences in metal cost would have occasioned inquiry, and all, instead of only a few, manufacturers would have adopted the practice.

(3) An examination of the costs of two manufacturing concerns showed that in one case the unproductive labour was 60 per cent. of the productive labour, and, in the other case, only 32 per cent., although both were producing the same goods with similar machinery.

Investigation indicated that in the former case the extra cost was attributable not only to overstaffing, but also to faulty lay-out and unnecessary handling charges.

Similar illustrations could be given, all showing that a close study of the interests of an industry as a whole would benefit the individual interests of each member of that industry, and that the knowledge of individual businesses applied to whole trades means an increase in production and reduction in cost.

> "By mutual confidence and mutual aid
> Great deeds are done and great discoveries made.
> The wise new prudence from the wise acquire,
> And one brave hero fans another's fire."

It is that spirit which it is the aim of the Whitley Report to foster, and which for the national prosperity of the country it is desired to create in every industry.

Costs and the Consumer.

To a large extent waste in production falls on the consumer. Although prices are regulated by competition, there is always a tendency to keep prices up by rings and combines rather than to reduce production costs by centralisation and organisation and the elimination of waste. Provided a manufacturer can get a price for his products which leaves him a fair return for his enterprise and the risks he undertakes, he is generally content, and the consumer has no remedy, although as the result of scientific administration the cost of production could be materially reduced.

The experience of State control of industry during the war has shown that efficiency in management means reduction in cost. Information has been collected showing the best methods of production to be adopted, and such information has been furnished to the firms engaged in those industries; detailed costs have been obtained from

National Factories and private contractors, and statistics circulated showing the costs at which the products should be obtained. Some of the reductions made in the prices of shells and similar munitions have been as high as 50 per cent. of the original price; and this reduction has not been due so much to cutting of the contractor's profit as to reduction in the cost of production despite increase in the rates of wages.

The investigations of contractors' costs made by the Government Departments and the fixing of standard prices based on the cost of each operation have forced many manufacturers to alter their methods of production in order to earn a profit. Why should not the same system be continued and for staple products, periodical cost investigations made and maximum prices fixed ? There would then be no objection to combines and trusts, and their energies would be devoted to producing economically instead of destroying competition in order to increase selling prices.

Compared with the United States, factories in this country are generally not as well equipped ; machinery is not scrapped to make way for improved types which will produce more economically ; problems of distribution are but little considered, and as the result of these and similar handicaps. foreign trade is lost and the home-consumer pays.

Yet experience has clearly demonstrated that reduction in price means increase in demand with higher wages for the workers and larger return on the capital employed.

Bicycles, motor-cars, and gramophones—to mention but a few of the commodities at one time high priced but, owing to reduction in price, brought within reach of the many—are examples of the development of trades through reduced production costs. A study of the costing system at the Ford Company's works would show, however, that the low selling price has only been made possible by standardisation and the scientific consideration of the stages in manufacture where production cost could be reduced and waste avoided. Yet the Ford Company pay rates of wages that were unheard of in the early days of the motor-car industry.

Uneconomical production benefits nobody.

Scientific Management.

It has been suggested that scientific management means the adoption of the Taylor, or some similar system, resulting in the management doing all the thinking and the worker merely performing certain operations in accordance with instructions, thus eliminating all skill in workmanship.

Scientific management actually is the more intensive application of brain-power to industry ; the consideration of the science of production in order to prevent waste

and loss of material, to save unnecessary labour effort, to reduce the amount of capital employed.

There has been considerable discussion latterly about the form which control of industry should take.

In an interesting paper on "The State and the Producer," Mr. John Hilton suggested four possible methods, viz. :—

(1) Democratic control, with or without ownership, by councils or guilds representing all those engaged in the industry

(2) Autocratic control by the business interests as hitherto.

(3) State or public control of businesses privately owned or run.

(4) State or public ownership.

But efficient and economical production, so necessary both in the interests of the worker and of the consumer, does not depend on the nature of the control but on the brains of the directing force.

So long as the organisation is small, the single individual can keep in such close touch with the administration that, provided he has the necessary ability, he can from his own personal knowledge, direct the control of the undertaking both efficiently and economically. Experience has, however, shown that centralisation and intensive production mean reduction in production cost under proper administration, and the directing force in a larger undertaking cannot have that intimate knowledge which the controller of a small business derives from personal observation.

The availability of reliable statistics is consequently essential to ensure the proper direction of the undertaking, yet, until latterly, the value of statistical information has been little appreciated and less understood. Policy can only be satifsactorily determined if reliable facts are available upon which opinions can be framed, and the preliminary step in any system of scientific management is to instal the necessary machinery to afford information as to costs and other production data. The man who makes a business of betting studies the form of every horse, the course on which it runs best, the distance which suits it most ; and to obtain this information he pays touts to watch the trials and furnish him with the material for the comparative statistics he requires.

Is it not equally necessary for those engaged in industry to base their direction of the undertaking on facts, instead of on opinions which cannot be substantiated ?

It follows, therefore, that if the Whitley Councils are to be the means of securing effective joint control of

industry by employers and employed ; if the worker is to assist in obtaining the maximum efficiency of production for the benefit of the community ; if co-operation in the national interests is to replace competition for selfish motives, then the Whitley Councils must have before them as the materials for this work proper statistics of costs and similar workshop data before industry can profit by their services.

Statistical research is the basis of industrial reorganisation.

Conclusion.

For some months the air has been heavy with the breath of reconstruction ; platitudes anent the betterment of the condition of the workers, of the renaissance of a new era of social conditions, have dropped like oak leaves in an autumn gale ; the utterances of some speakers would indicate that the millennium was at hand. But the war, although it has altered public opinion on many points, has not changed human nature ; the desire for social advancement, the wish for more congenial environment, the ambition to "get on," the longing to possess something regarded as a luxury, and the hope of parents to promote the interests of their children, still remain the incentive to work. It has, however, shown us that our former self-satisfaction in the efficiency of our manufacturing productivity was not justified, and that considerable alterations in our methods are necessary to prevent that waste which only now has it been appreciated exists ; it has awakened us to the fact that the worker cannot be expected to put forward his best efforts if he be denied the fruits of his increased activity and precluded from taking any interest in the industry on which he depends for a livelihood ; it has proved to us that scientific research and statistical research are the necessary preludes to better administration, better organisation, and increased industrial efficiency.

We have commenced a new chapter in the nation's history, a chapter headed "Peace." Are future generations to read therein the tale of hopes dispelled, of ideals shattered, of sacrifices in the great struggle through which we have passed all made in vain ; or are they to find the awakening of a new industrial spirit, a new conception of the duties of employers and employed to the State of which both are members, the settlement of those grievances and misunderstandings which in the past have hindered progress and reform ?

The answer rests with us ; with those of us who for one reason or another have been spared to carry on the nation's work, and to turn to good account the heritage for which to maintain unscathed the best of our blood has been spent.

What is to be our reply ?

We have lost a lot in those war-scarred years
Of sorrow and grief and pain;
But the life we lived in the vale of tears
May prove in the end our gain.
For our old ideas,
And hopes and fears,
Are dead—and we start again.

We start with the hope of a better world,
For that we have paid the toll;
We dream, with the banner of Peace unfurled,
Of a new industrial soul;
And the men who died
On the other side
Still live—if we reach our goal.

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